



33 Moulton Street
Cambridge MA 02138
617 499 8000
acentech.com



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Alex Adkins
DiMella Shaffer
281 Summer Street
Boston, MA 02210

Subject: Community Sound Evaluation
Brookhaven Repositioning and North Building
Lexington, MA
Acentech Project No. 626591

Dear Alex:

This letter presents our review and recommendations on the proposed rooftop equipment for the Brookhaven Repositioning and North Building project in Lexington, MA. This project site needs to comply with the Town of Lexington noise regulation as well as the Massachusetts state regulation.

APPLICABLE NOISE REGULATION

The Lexington Noise By-Law is identical to the Massachusetts Division of Air Quality Control Noise Policy. It defines noise pollution by the condition resulting when:

- A broadband noise source raises the noise level by 10 or more dBA above the ambient noise
- A tonal sound source that raises its octave band noise level by three decibels or more above the adjacent octave band levels.
- In determination of noise violation on private property, the noise measurement shall be made at the boundary of the property in which the offending sound source is located.

The ambient noise level, L_{90} , is the sound level that is exceeded 90% of the time.

AMBIENT SOUND LEVEL MEASUREMENT PROTOCOL

We visited the project site to install three noise monitors at the three locations shown in Figure 1 that collected background sound levels over approximately five days—from May 31 to June 5, 2017—at ten-minute measurement intervals. Statistical background sound levels were collected continuously as part of the measurement protocol to carefully document the existing background sound levels to be used as the reference for our sound analysis, which included L01, Leq, and L90. The three locations are representative of the background sound levels of the general area, north/west, east, and south of the Brookhaven campus. The same measurements can be made at the three locations along the property lines for verification as needed.



Figure 1 – Sound monitoring locations near Brookhaven at Lexington

The results of our sound measurements are summarized below. Refer to Figures 2, 3, and 4 attached in the Appendix at the end of this report for the complete collected sound levels at the project site.

The emergency generators will be tested during the daytime hours, per the noise ordinance between 7AM and 8PM for maintenance power equipment. Table 1 shows the average lowest ambient sound level as defined in this time range, and Table 2 shows the average lowest ambient sound level during nighttime hours.

Table 1 – Average Lowest Daytime Ambient Sound Levels (7AM - 8PM)

Location	A-weighted L ₉₀ , (dBA)
1	44
2	40
3	45

Table 2 – Average Lowest Nighttime Ambient
Sound Levels (other times)

Location	A-weighted L ₉₀ , (dBA)
1	37
2	32
3	39

Based on the results of the measurements at Brookhaven, the broadband sound emissions by the facility should not exceed **50-55 dBA during the daytime hours** and **42-49 dBA during the nighttime hours**, depending on the receiver location.

PREDICTED SOUND LEVELS

The design team has provided us with the preliminary rooftop equipment layout and sound data. Most equipment are located on the roof level and the generators are located on grade. We have predicted the sound levels of the future equipment to the property lines with our CadnaA computer modeling software. We have also included some major existing equipment as part of our evaluation.

We have assumed that for typical nighttime and daytime conditions, all outdoor mechanical equipment will operate at full capacity in the worst-case scenario. One exclusion to this is the existing cooling towers; Based on our existing measurements it was clear that the existing cooling towers were not operating during the quietest times of the nighttime hours. Therefore, this has been excluded from our prediction for the nighttime conditions. In addition, for generator testing daytime conditions, we have assumed that one emergency generator will be tested at a time.

The list of preliminary new equipment and existing major equipment included in our study is as follows:

North Building

- One new 600 kW diesel emergency generator within a sound enclosure, similar to Pritchard Brown enclosure
- Two air handling units serving the North Building, approximately 5000 cfm each, similar to Lennox LHA120
- 50 to 60 small air-cooled condensing units serving the North Building residences, 1.5 ton to 3 ton, similar to Lennox HS

Commons Building

- One new 600 kW diesel emergency generator within a sound enclosure, located next to the existing loading dock
- One new dehumidification air handling unit, approximately 17,000 cfm, similar to Munter unit with plenum fans.
- Two new energy recovery units, approximately 5400 cfm each, similar to Valent VPRE
- One new air cooled condensing unit, 15 ton, similar to Lennox LHA180
- Three existing cooling towers next to the loading dock, operating mostly during the day and generally off during late evening hours
- Three existing air handling / energy recovery units on the roof at two locations

- One existing 500 kW diesel emergency generator at the existing loading dock (indoors).

Figure 5, attached in the Appendix at the end of this report, shows the preliminary roof plans of the North Building and the Common Building indicating the approximate location of the MEP outdoor equipment. As the design develops, these locations may adjust slightly but should not impact the results of our predictions significantly. As the design develops we will update these units accordingly to confirm that sound levels will still be within the allowable limits.

Figure 6 below shows the closest residential receivers to the project. Sound produced by the project with the above proposed equipment are projected to these receivers.



Figure 6 – Sound receiver locations

Tables 3 and 4 shows the results of our sound predictions, during daytime and nighttime hours, respectively:

Table 3 – Predicted Daytime Sound Levels

Receiver Location	Predicted Daytime Sound Levels with One Generator On* (dBA)	Predicted Daytime Sound Levels without Generators (dBA)	Daytime Sound Limit (dBA)
1	51	50	54
2	54	42	54
3	54	52	54
4	49	43	50
5	42	42	55

* The sound levels are predicted based on the closest generator being tested to the respective receiver. These are representative of worst-case condition at each receiver location when the generators are being tested.

Table 4 – Predicted Nighttime Sound Levels

Receiver Location	Predicted Nighttime Sound Levels (dBA)	Nighttime Sound Limit (dBA)
1	44	47
2	40	47
3	41	47
4	38	42
5	42	49

Tables 3 and 4 show that the predicted A-weighted levels with the noise control implementations described in the equipment list above will be within the allowable sound limits.

TONE EVALUATION

Based on the equipment sound data and the predicted sound levels to the receivers, we found the sound levels with the noise control implementations described above will not produce tonal sound to the area.

CONCLUSION

Based on our preliminary evaluation of the outdoor equipment for Brookhaven Repositioning and North Building project, the equipment sound levels the community are within the acceptable sound limits and will not produce any tonal sound.

* * * * *

I trust this letter provides the information that you need at this time. If you have questions, please call me on my direct line at 617.499.8080.

Sincerely,

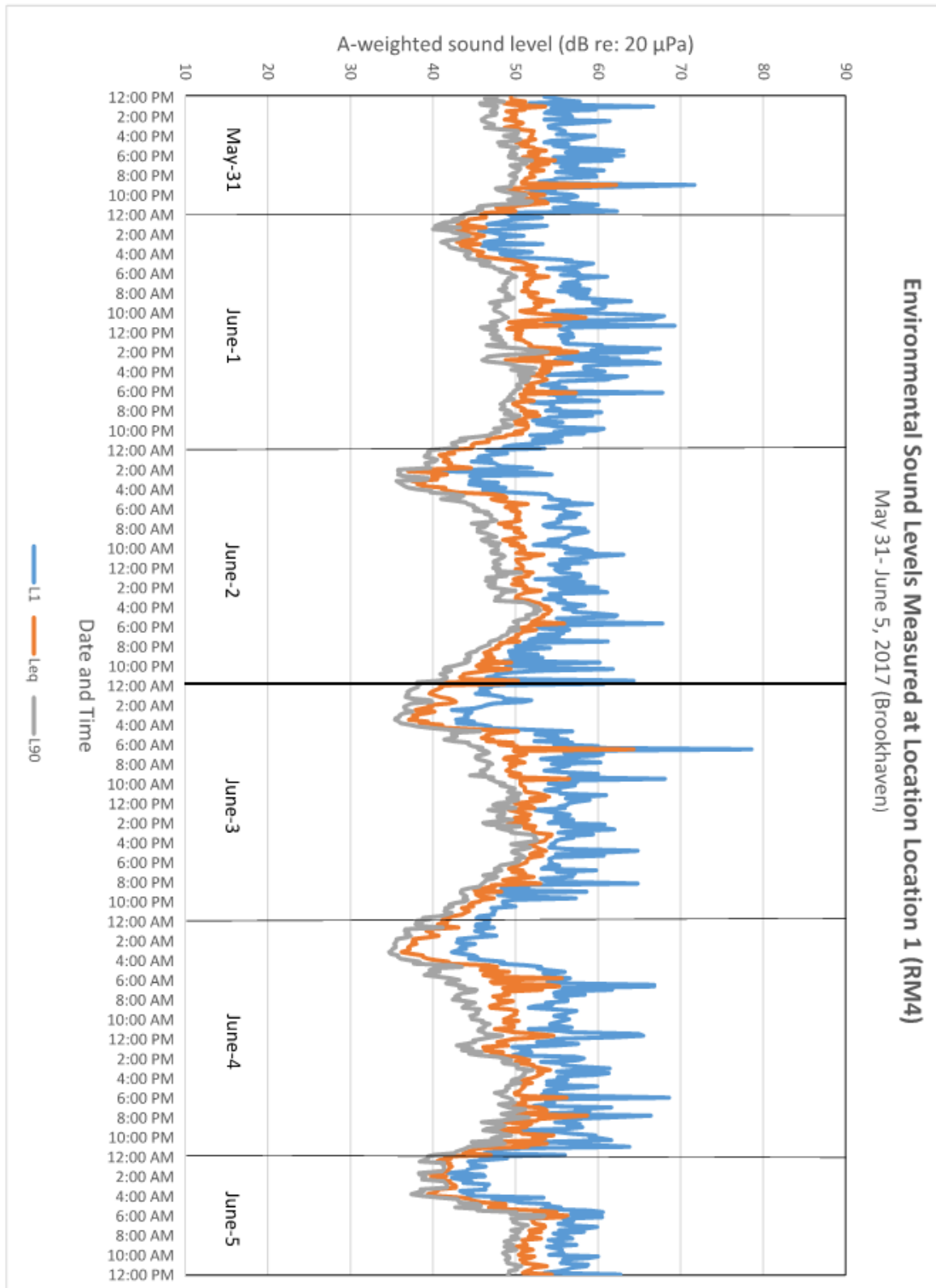


Rose Mary Su
Senior Consultant

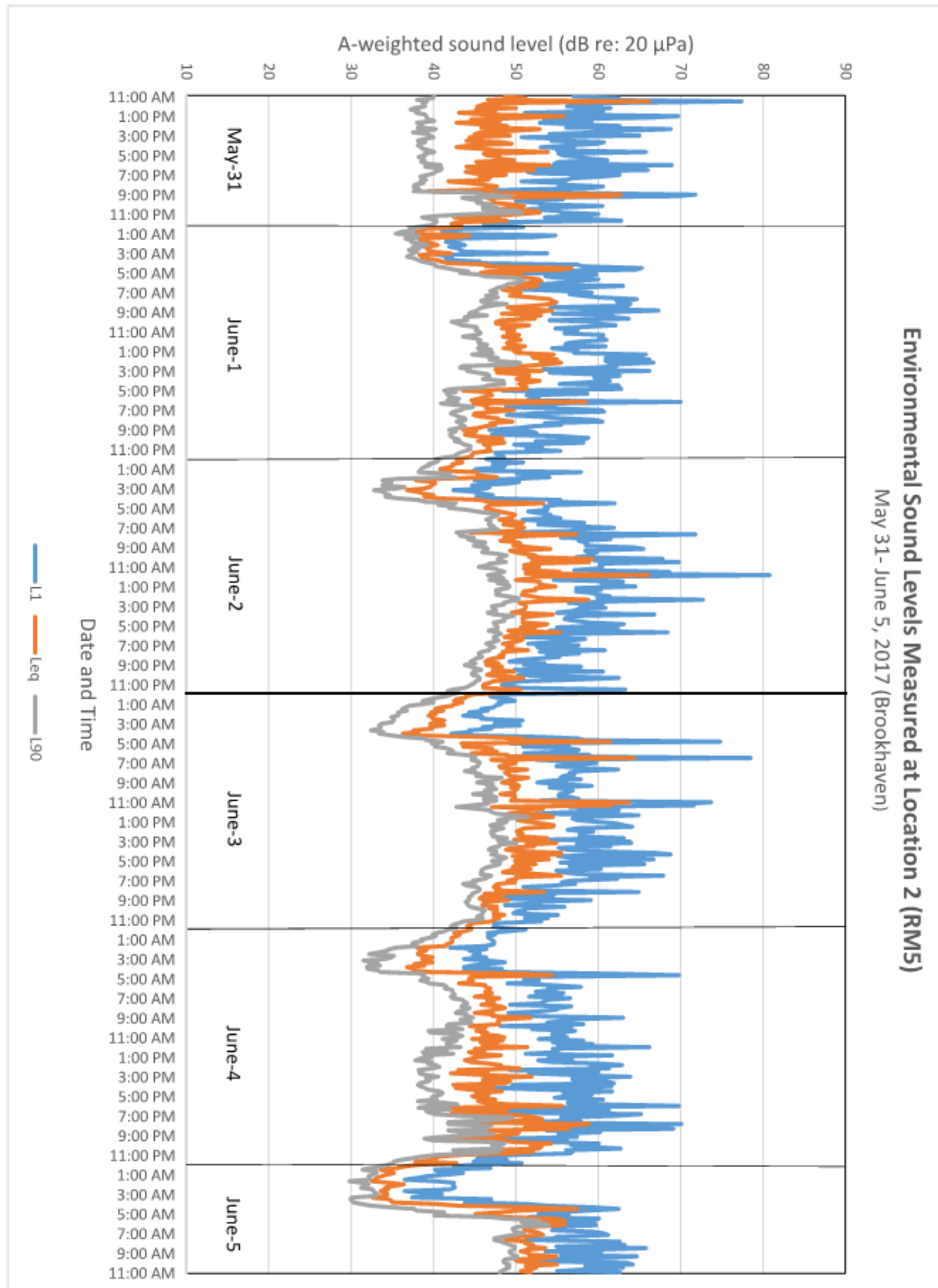
Encl: Kristen Murphy

cc: Appendix – Figures 2, 3, 4, and 5

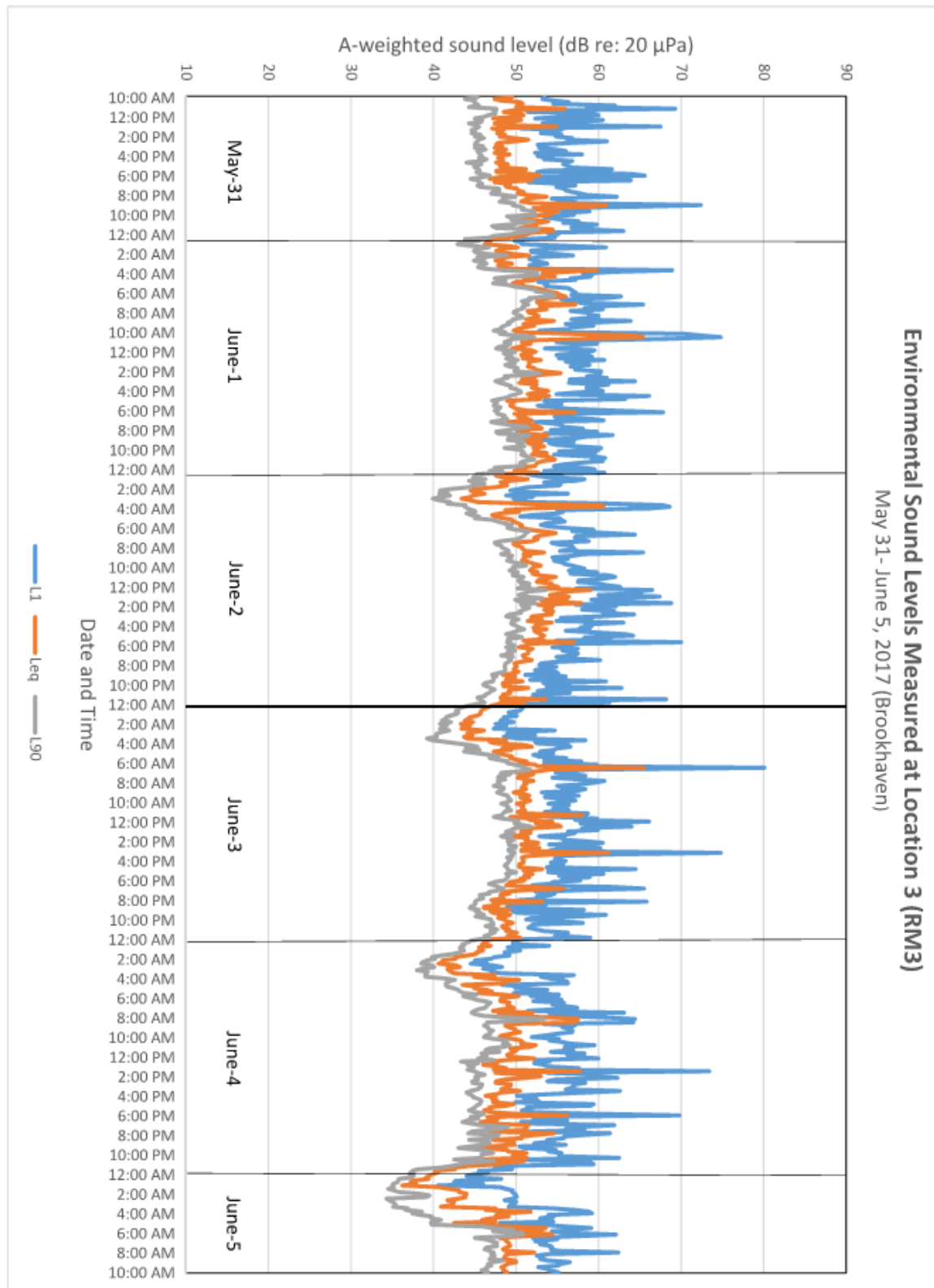
APPENDIX – FIGURE 2



APPENDIX – FIGURE 3



APPENDIX – FIGURE 4



APPENDIX – FIGURE 5 (PRELIMINARY OUTDOOR EQUIPMENT LOCATIONS)

